PATENT SPECIFICATION

Application Date: Oct. 10, 1939. No. 27604/39. **533,116**

Complete Specification Left: Sept. 24, 1940.

Complete Specification Accepted: Feb. 6, 1941.

PROVISIONAL SPECIFICATION

Improvements in and relating to Diaphragm Valves

We, SAUNDERS VALVE COMPANY LIMITED, a Company incorporated under the laws of Great Britain, of Grange Road, Cwmbran, Monmouthshire, England, and PHILIP KEITH SAUNDERS, a British subject, of "Pant-y-berllan", Grange Road, Cwmbran, Monmouthshire, England, do hereby declare the nature of this invention to be as follows:—

This invention relates to fluid controlling diaphragm valves of the kind in which the diaphragm is clamped at its periphery between the valve body and a bonnet accommodating the valve actuating gear and is moved against its seating in the body by a diaphragm compressor having a series of projecting fingers which inter-engage a series of diaphragm supporting toes projecting inwards from the periphery of the bonnet.

The object of these fingers is to support the diaphragm when the valve is closed and of the toes to support the diaphragm when the valve is open thus enabling the diaphragm to withstand pressure which would burst it but for the presence of the fingers and toes.

Such valves are illustrated in the applicant Company's Patent Specifications 321,892, 362,084, 434,664, 434,684, 468,664, 16520/38 (Serial No. 516,569) and 16521/38 (Serial No. 516,526).

In some valves and particularly in large valves operated by a non-rising actuating spindle which engages a nut or equivalent member on the compressor it is necessary for the compressor to be guided to prevent it tilting due to unequal pressures on the portions of the diaphragm open to the up-stream and down-stream sides of the valve when at or near the closed position.

This is effected, according to the invention, by using one or more of the toes to contact with the surface of the central part of the compressor from which the fingers project.

In a preferred arrangement of diaphragm valves having a substantially straight through bore intersected by a shallow weir extending across the bore and having a concave face forming a seating for the daphragm, the diaphragm compressor has as is usual projecting arms transverse to the plane of the weir and the fingers project from these arms on either side parallel to the plane of the weir. The central fingers on each side in the plane of the weir engage grooves in the sides of the bonnet thus providing a continuous surface right across the compressor in the plane of the weir ensuring that the diaphragm is positively clamped from end to end against the weir when in the closed position.

The transverse arms are in accordance with the invention slotted in the transverse direction and the slots are engaged by transverse toes of considerable depth in the direction of the operating spindle. These transverse toes co-operate with the body of the compressor over a sufficient length (in the direction of the operating spindle) to prevent any tendency to tilt about an axis in or parallel to the plane of the weir.

Dated this Ninth day of October, Nineteen hundred and thirty nine.

PETER T. STEPHENS,
Chartered Patent Agent,
Agent for the Applicants.

COMPLETE SPECIFICATION

Improvements in and relating to Diaphragm Valves

We, SAUNDERS VALVE COMPANY LIMITED, a Company incorporated under the laws of Great Britain, of Grange Road, Cwmbran, Monmouthshire, England, and PHILIP KEITH SAUNDERS, a British subject, of "Pant-y-berllan", Grange Road, Cwmbran, Monmouthshire, England, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to fluid controlling diaphragm valves of the kind in which the diaphragm is clamped at its periphery between the valve body and a

[illegible]

bonnet accommodating the valve actuating gear and is moved against its seating in the body by a diaphragm compressor having a series of projecting fingers which inter-engage a series of diaphragm supporting toes projecting inwards from the periphery of the bonnet.

The object of these fingers is to support the diaphragm when the valve is closed, and of the toes to support the diaphragm when the valve is open thus enabling the diaphragm to withstand pressure which would burst it but for the presence of these fingers and toes. Such valves are illustrated in the applicant company's Patent Specifications, Nos. 321,892, 362,084, 434,664, 434,684 and 516,526, and are hereafter referred to as " of the type described ".

In some valves and particularly in large valves operated by a non-rising actuating spindle which engages a nut or equivalent member on the compressor as in Specification No. 516,526 it is necessary to prevent the compressor tilting due to unequal pressures on the portions of the diaphragm open to the up-stream and down-stream sides of the valve when at or near the closed position.

This is effected, according to the invention by using one or more deep toes on the bonnet to guide the central part of the compressor. One embodiment of the invention is illustrated in the accompanying drawings in which:

Fig. 1 shows an elevation half in section of handwheel operated valve in accordance with the invention,

Figs. 2 and 3 show a sectional elevation and plan respectively of the diaphragm compressor used in the valve illustrated in Fig. 1.

Referring now to the drawings, the valve has a substantially straight through bore (1) intersected by a shallow weir (2) extending across the bore and having a concave face (3) forming a seating for the diaphragm (4). The diaphragm (4) is secured by a bonnet (5) which clamps it around its periphery to the valve body. The bonnet (5) accommodates handwheel actuating mechanism for operating the valve.

The diaphragm compressor has, as is usual, a central cylindrical part (6) from which project arms (7) transverse to the plane of the weir (2). Fingers (8, 9) project from these arms (7) on either side parallel to the plane of the weir (2). The central fingers (9) on each side in the plane of the weir (2) engage grooves (10) in the sides of the bonnet (5) thus providing a continued surface right across the compressor (6) in the plane of the weir (2) thus ensuring that the diaphragm (4) is positively clamped from end to end against the weir (2) when in the closed position.

The transverse arms (7) have, in accordance with the invention, slots (11) in the transverse direction and these slots (11) are engaged by transverse toes (12) of considerable depth which guide movement of the diaphragm compressor by contacting its central cylindrical part (6).

The diaphragm compressor has, as is usual, a nut (13) loosely located in the central part (6) near the end remote from the diaphragm (4). An actuating spindle (14) engages the nut (13) and project through the top of the bonnet (5) and carries on its end the handwheel (15).

When the valve is in the closed or nearly closed position, as shown in Fig. 1, the difference in the pressure of the fluid controlled on the up-stream and down-stream sides of the valve will tend to cant the compressor (6) in a clockwise direction (Fig. 1—fluid controlled flowing in direction of arrow). As will be observed this tendency is prevented by the deep toes (12) which engage and guide the central part (6) of the compressor over a substantial part of its length.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. A diaphragm valve of the type described in which the central part of the compressor is guided by one or more deep toes.

2. A diaphragm valve of the type described in which the compressor has diametrically, opposite slotted arms projecting from its central part transversely to the plane of the weir and the bonnet carries diametrically opposite deep toes which engage said slots and contact said central part.

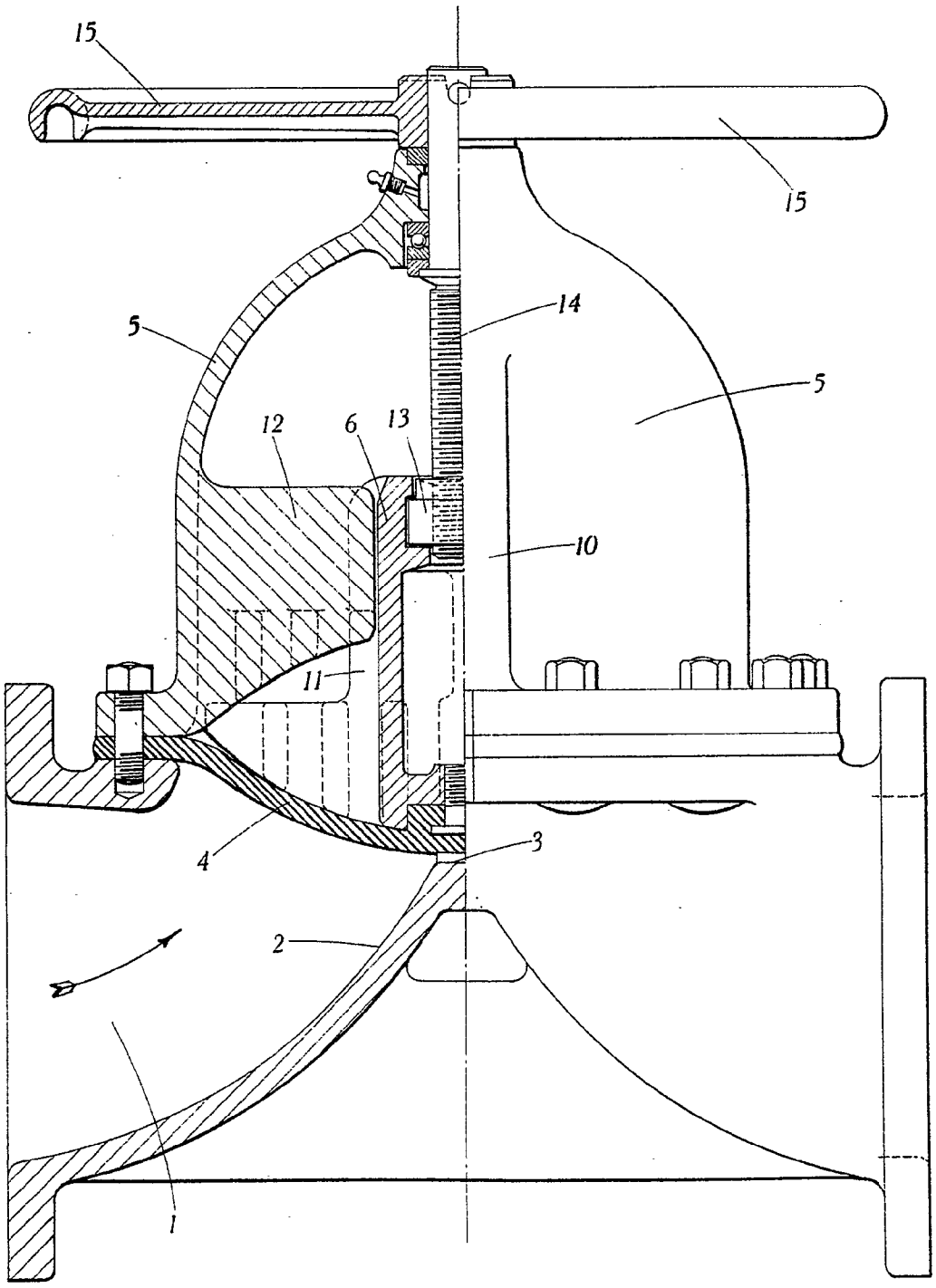
3. A diaphragm valve substantially as described with reference to the accompanying drawings.

Dated this Nineteenth day of September, One thousand nine hundred and forty.

PETER T. STEPHENS,
Chartered Patent Agent,
Agent for the Applicants.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1941.

Fig. 1.



[This Drawing is a reproduction of the Original on a reduced scale.]

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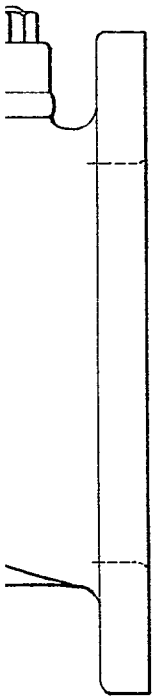


Fig. 2.

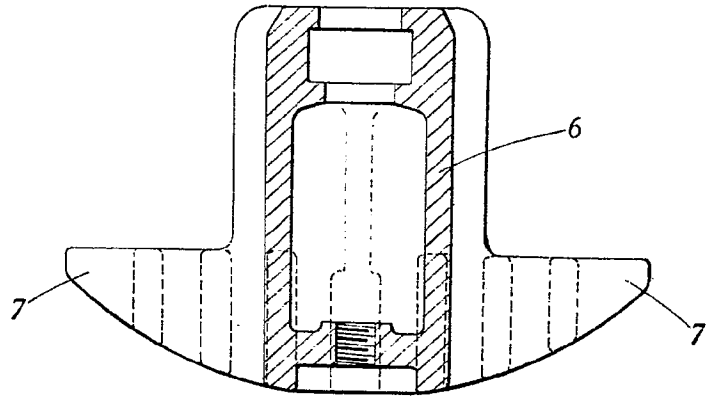


Fig. 3.

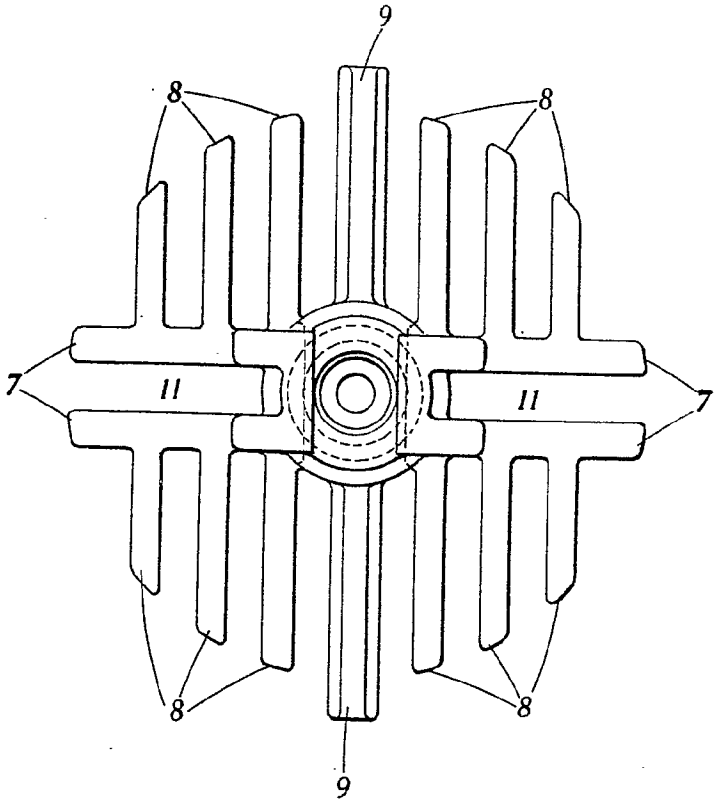


Fig. 1.

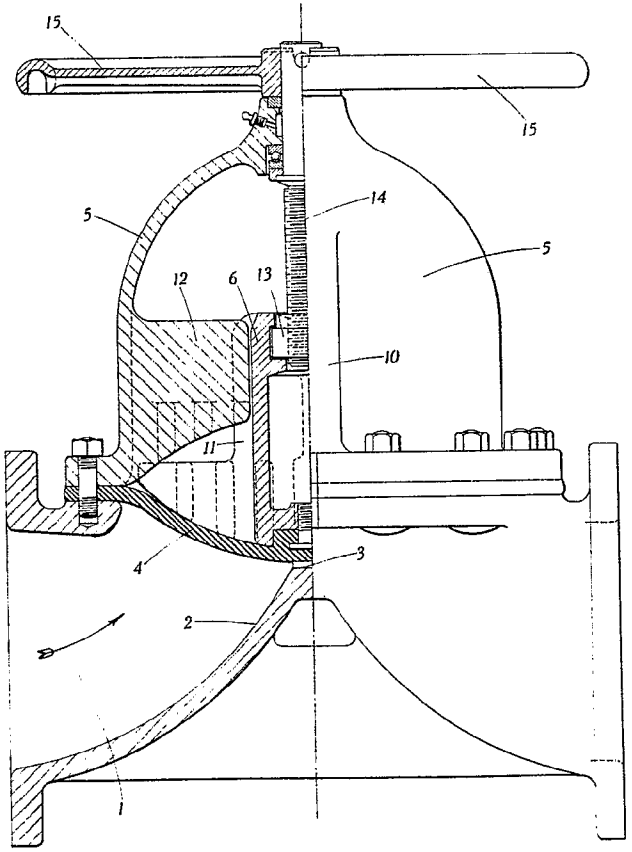


Fig. 2.

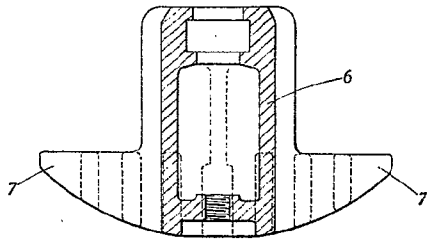
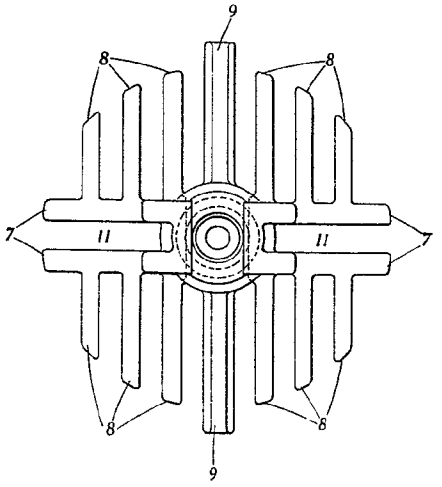


Fig. 3.



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